

Otis (F.N.)

Duplicate

A DESCRIPTION
OF THE
INSTRUMENTS AND APPARATUS
OF THE AUTHOR,
WITH
DIRECTIONS FOR THEIR USE,
IN OPERATIONS ON THE
GENITO-URINARY ORGANS.

BY F. N. OTIS, M.D.,

Clinical Professor of Genito-Urinary Diseases in the College of Physicians and Surgeons, New York.

Reprinted from the Ohio Medical and Surgical Journal for April, 1877.

COLUMBUS:
NEVINS & MYERS, BOOK AND JOB PRINTERS.
1877.



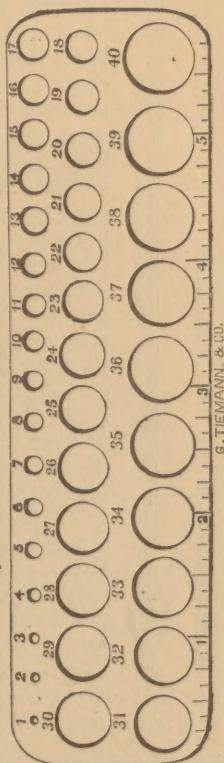
INSTRUMENTS AND APPARATUS

FOR USE IN OPERATIONS ON

THE GENITO-URINARY ORGANS.

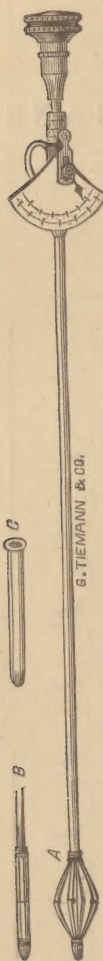
The Urethral Scale.—This is graduated by the French millimetre from 1 m. in circumference to 40. On the opposite side are the numbers of the English scale. "The scale for grading the sizes of instruments has never been very accurately fixed, except in France."* The French scale (*Charrière's filière*) increases by one millimetre in circumference. This is a recognized standard scale in all countries, at the present day, and the sizes of all other scales must be translated into this, in order to become intelligible in descriptions of cases. It is not rare to find urethræ with normal calibre of 40. The entire set, from 8 m. to 40, is absolutely essential to every surgeon who desires to make complete and accurate urethral measurements. The stricture which will permit say 25 of this scale to pass without obstruction, will often hold distinctly and firmly upon a bulb measuring 26f. It is thus shown that the gradation of this scale is not too fine, and that no numbers can be dispensed with.

The Urethra-meter.—With this instrument an accurate measurement of the normal urethral calibre may be made, in any case, within the compass of the instrument, the bulb of which can be



*Genito-urinary diseases, Drs. Van Buren and Keyes, New York, 1875, p. 111.

made to expand from 20f to 45f.† The dial, near the handle, indicates, in millimetres, the exact amount of expansion of the bulb.



Introducing it closed (and covered with the rubber cap, which serves to protect both the instrument and the uretha) down to the bulbo-membranous junction, by means of the screw at the handle, the bulb expands up to the point of the sensation of fullness felt by the patient. The hand on the dial will then point to the figure representing the normal calibre of the canal under examination. Strictures in the regions anterior to the bulb may also be accurately defined and measured by this instrument. When the bulb is suddenly arrested in withdrawal, the screw should be gradually turned until the bulb is permitted to pass. The position of the hand on the dial will then indicate the calibre of the stricture. It should, however, be borne in mind that, when the urethra is very sensitive, spasmodic contraction may simulate an organic stricture. It is, therefore, necessary to verify the results of this examination with the bulbous sound before deciding that true stricture exists. If the latter instrument defines a contraction at the same point, by measurement, and, when passed beyond it, is distinctly held on return, the proof of organic stricture is complete. When the urethral contractions are below the calibre of the closed bulb, or when they are numerous and close together, the normal calibre of the canal may be assumed from the circumference of the flaccid penis. When the circumference is 3 inches the urethra has a normal calibre of at least 30f; if $3\frac{1}{4}$ it will be 32f; if $3\frac{1}{2}$ —34f; if $3\frac{3}{4}$ —36; if 4 inches—38; if $4\frac{1}{2}$ inches—40, or more.

The Bulbous Sound.—This is intended solely for detecting the size, length, and locality of the urethral strictures. After ascertaining the normal calibre of the presenting urethra, a bulbous sound of corresponding size should be well oiled and presented at the meatus. If it passes in readily, this may be accepted as representing the normal calibre. If only a smaller size will enter, the difference between this size and that indicating the normal calibre will show

†Messrs. Tieman & Co have succeeded in making the Urethra-meter of a calibre of 12f, a fine instrument. Both Tieman and Otto & Sons make it of 18f, which is perhaps as small as is consistent with durability.

the exact amount of contraction present at this point. This contraction should be divided so thoroughly that the full-sized bulb can enter without the least sense of obstruction. The bulb should then be advanced along the canal. If deeper obstruction is met, a smaller-sized bulb should be selected, and when one is found which just passes the contracted point, slightly stretching it, on attempting the withdrawal of this bulb it will be firmly held by the posterior border of the stricture. The distance between the point of arrest of the large bulb and the point of holding of the smaller, carefully measured, will give you the position and length of the stricture, and the size of the smaller bulb will indicate its calibre. The same method of procedure will apply to the diagnosis of any remaining contractions of the deeper portions of the canal. In the curved portion the shaft of the bulb should be bent to correspond with the sub-pubic curve.

The Bulb-Pointed Bistoury, or Meatotome, is intended for



division of contractions at or within an inch of the meatus. This, well oiled, should be advanced into the meatus, while the end of the penis is supported by the fore-finger of the opposite hand, and carried along, with the bulb point bearing against the superior wall of the canal, until well behind the posterior border of the contraction. It should then be depressed, and the cutting edge drawn firmly and slowly down, cutting deeply in withdrawal, and carefully preserving the vertical direction of the natural orifice. The tissues in this locality are usually dense and resilient, and the firm support of the finger under the glans is required to effect a proper division, which should never be expected, or attempted, in a single cut. An incision having been made, its extent should be ascertained by the larger bulb, and if, as is more than probable, it fails to pass, or if, in passing, it is caught on return, the same proceeding should be repeated until the free passage of the full-sized bulb in entrance and withdrawal is secured.

The hæmorrhage following may be slight, ceasing after a few moments' pressure, or it may be profuse, requiring some mechanical appliance for its arrest. A short

Urethral Tube of silver or gutta-percha two m. below the normal calibre may be introduced and fastened by

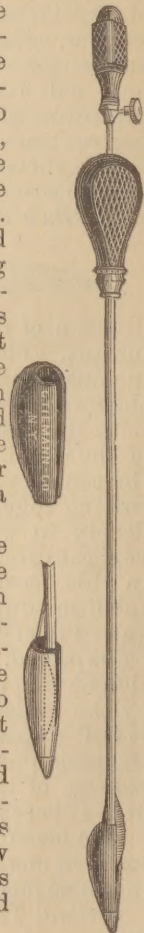
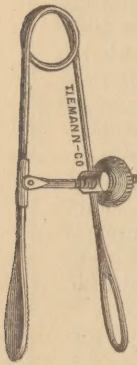


means of a narrow bandage, the pressure of which, bearing upon the tube, will effect the desired result. The danger of free hæmorrhage is not past until healing of the cut surfaces is well advanced, and should be provided for in all cases for at least forty-eight hours.

The *Spring Tampon* may be conveniently used for the same purpose. It consists of steel or German silver wire, bent so as to form a spring with parallel arms, the upper of which is provided with a fenestrated end, which helps to hold the instrument in place, while upon the lower a little styptic cotton or lint is wound. The arms are approximated by a thumb-screw, until they readily enter the canal, to a point just behind the incision, when, by loosening the screw, the pressure just sufficient to arrest the hæmorrhage may be readily made.

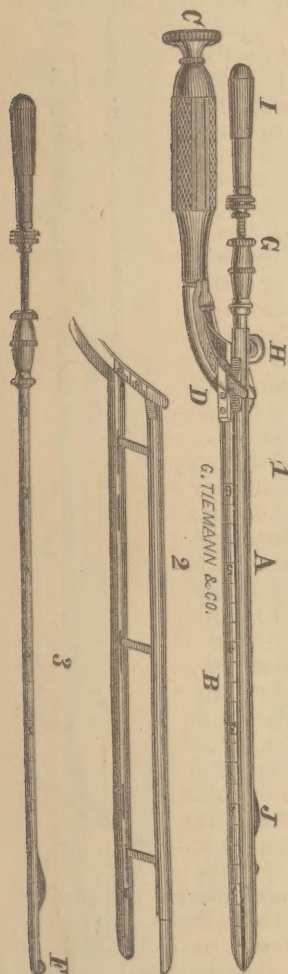
The full-sized bulb should be passed daily, or at least every other day, until healing is complete. Should the least recontraction occur, it is an evidence that some fibrous bands have escaped division, and the operation must be repeated, if a perfect result is desired. The after treatment of a urethrotomy consists in keeping the divided tissues from reuniting, and this is most effectually done by the daily passage of a conical steel sound. For dividing deeper strictures, the simplest, and which answers a good purpose in dense narrow strictures, is the

Bulbous Urethrotome.—This in shape is like the bulbous sound, so constructed that, after passage through a stricture, a broad blade concealed in the bulb is drawn forward through the contracted point, by means of a handle which traverses the hollow shaft of the instrument. The blade is pushed back through the stricture into its place of concealment, and the instrument withdrawn; and if the bulb has been of sufficient size to make firm resistance, on attempted withdrawal *before*, and meets with none *after* incision, it is probable that the test by a bulbous sound of the size of the normal canal will show that the division has been complete. The bulbs of this urethrotome are readily changed, and range in size from 20f to 40f.



In order, however, with certainty to divide completely any stricture, by the internal method, the principle of dilatation (which, to a certain limited extent, obtains in the bulbous urethrotome) must be prominently combined with the incision, and this is best seen in the

Dilating Urethrotomes, of which there are four. No. 1 consists of a couple of parallel bars,



which are separated at will by means of a screw at the handle. The upper bar carries a canula, in which a narrow blade is concealed, and is made salient by being drawn forward, or pushed backward over a short elevation on the floor of the canula. The canula, being movable, enables the operator to elevate the knife at any point along the upper bar without moving the instrument. The bars when closed represent a size of 23f; when fully separated, 40f. The instrument is introduced closed; the bars are then separated by means of the screw at the handle, until the full size of the normal urethral calibre is reached. The blade, which has been previously adjusted to emerge at the point of stricture, is then drawn forward, and the stricture thoroughly divided. By loosening the screw which fixes the position of the canula in the bar, the knife may be raised and the canula drawn forward, thus cutting any desired distance. The amount of dilatation is registered on a scale near the handle. This is a strong, efficient instrument, but can not well be made of a less calibre than 23f.

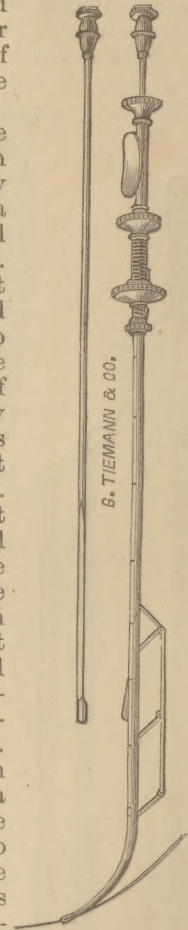
Dilating Urethrotome No. 2 is designed for a wider range of strictures. This, when properly made, may be closed to 20f and dilated to 45f. It has the further advantage of distending only a limited portion

of the canal contiguous to the locality of the stricture;

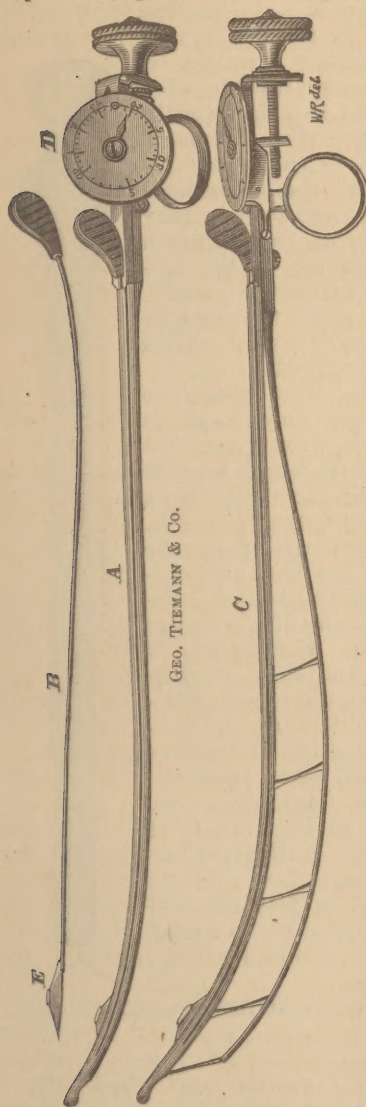
but the incision can only be made of one length, corresponding to the length of the bridge over which the blade runs. This, as usually arranged, is about one inch. The blades in this, and in the previously described, should be capable of projection, not less than one nor more than two millimetres. The amount of dilatation is indicated on a dial plate near the handle.

Dilating Urethrotome No. 3 should measure 18 $\frac{1}{2}$ when closed, and be capable of expansion to 45. It is curved so as to pass readily through the curved portion of the urethra when this is necessary. It is thus well adapted for the division of deep strictures. The cutting apparatus of this instrument differs entirely from Urethrotomes Nos. 1 and 2. In No. 3 the blade is guarded at the top like that of M. Maisonneuve, for the purpose of avoiding incision of the healthy portions of the canal in introduction; in the same way it limits the incision or withdrawal. This instrument is introduced closed, and without the knife, unless the stricture is very large. The knife is then carried down, the screw at the handle turned until the hand on the dial indicates two or three millimetres beyond the previously-determined normal calibre of the canal, and the blade is then drawn through the stricture or strictures. The instrument is then closed to 25 $\frac{1}{2}$ and withdrawn. Partial closure prevents pinching of mucous membrane. The results are ascertained by examination with the full-sized bulbous sound. If a *trace* of stricture is left, the operation should at once be repeated, either using a wider blade or dilating two or three more millimetres. In very resilient strictures two or more attempts are sometimes unavoidable before complete sundering of the strictures is effected—nothing short of which can produce *permanent* beneficial results.

The guarded blades of this instrument should not project more than four millimetres, nor less than three, above the shaft; and the guard should not exceed $\frac{1}{4}$ m. in breadth, as more than this will hold behind the stricture and prevent easy division. In case of very dense and resilient stricture,



a perfectly plain blade may be used, always in such event



turning the instrument down as soon as the blade has passed through the stricture.

Dilating Urethrotome No. 4 is like No. 3, except that it is smaller, quite straight, and can be used in division of strictures down to the bulbo-membranous junction, without the necessity of dilatation of the deeper portions of the canal; hence, for all operations in the ante-membranous region, it is much to be preferred to the longer-curved instrument. In skilled hands it may also be used to advantage in the deeper parts of the canal. It is made with less difficulty, is of smaller diameter (16f), and more easily managed in the straight portion of the urethra. The hæmorrhage following operation with the dilating urethrotome, after the manner described, is usually slight, and ceases on slight pressure with the fingers at the point of incision—often without it. In some cases oozing continues, and may require the introduction of the

Endoscopic Tube.—This is six inches in length and of a calibre 28f m. to 32, and provided with an entering shaft to facilitate introduction.—The tube is introduced to a point beyond the incisions, and pressure made by a narrow retaining bandage sufficient to control the hæmorrhage. The shaft is with-

drawn when the patient desires to urinate, which he readily

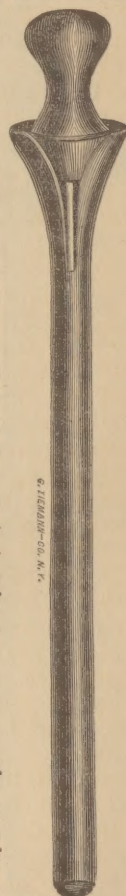
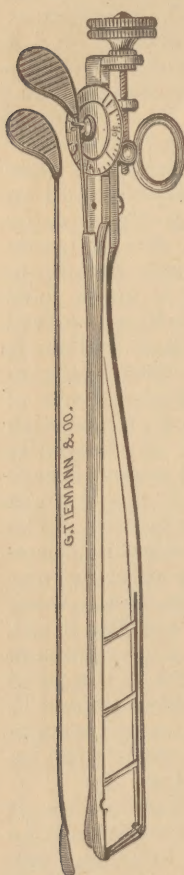
does through the tube, thus preventing contact of urine with the freshly-cut surfaces. Even if no hæmorrhage occur, it is well to introduce this tube, for the first twenty-four hours,

whenever urination is necessary. The tube, for easy introduction, should be about two sizes (millimetres) below the estimated normal calibre of the canal.

By means of the endoscopic tube, ocular examinations may be easily made at any point in the straight portion of the urethra. For controlling hæmorrhage at or near the meatus urinarius, shorter tubes, called meatoscopes, are used.

Solid Conical Steel Sound. —

The form most convenient is that figured on next page, the curve of which corresponds to an arc connecting the ends of a right angle measuring $1\frac{1}{2}$ inches. At the commencement of the curve, the size gradually diminishes, until, at the rounded extremity, it is one-fifth smaller than the shaft. For facility of introduction, and easy adaptation to the sub-pubic curve, simplicity of manufacture, and convenience in practice, it has my preference to all other varieties. The sizes run from 28† to 40, corresponding to the range of normal urethral calibre. Thus far, the extreme No. 40† has been met, once in fifty cases of adults; the opposite extreme,



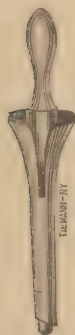
No. 28†, only once in three hundred. The average is about 32.

For preventing pain, irritation, and inflammatory action after operation, the

Cold Water Coil is valuable.

This apparatus is formed of a line of the small-sized India-rubber tubing of one sixteenth of an inch calibre, and six or seven yards in length. At the middle portion this tubing

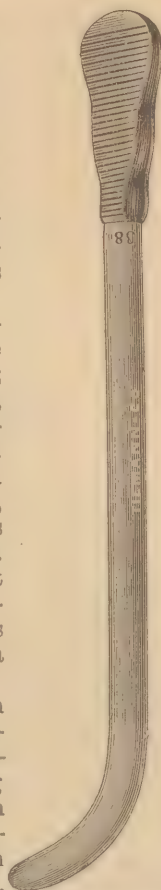
is coiled upon itself, so that, by half a dozen turns or more, it presents sufficient capacity to loosely encircle the entire penis.



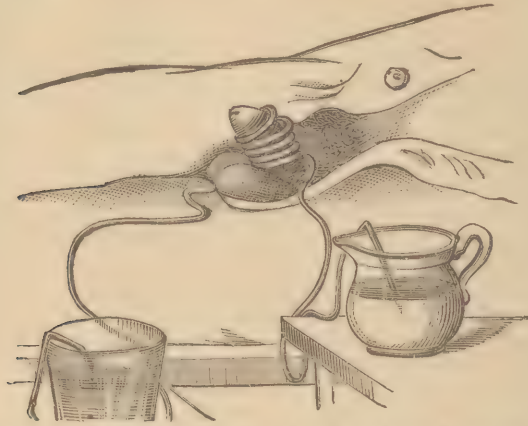
This coil, with the length of tubing proceeding from it, forms an apparatus through which, on placing one extremity of the tubing in a bowl or tumbler of ice-water, exhausting its contained air (by suction, or by drawing the tube through the finger), a siphonic current is established through the coil. The discharge-pipe being placed on a lower plane than the water-supply, the current may be kept up until the vessel is emptied.

The rapidity of the flow can be regulated, either by raising or lowering the end of either tube, which is the simpler plan; but the more convenient one is by a tapering, double, silver tube, attached to the discharge-pipe, a sponge being fitted to the inner tube. This sponge, when the inner tube is pushed down into the smaller end of the outer tube, becomes compressed and gradually obstructs the flow of water until not a drop will exude. This contrivance may be regulated so that either a free stream can pass, or that the single drops shall follow each other, more or less rapidly, with the regularity and precision of a time-piece.

By means of this arrangement, I have been able to apply cold to the penis, or scrotum, continuously, and conveniently both to the patient and the surgeon. The coils of tubing are retained in position by a band of cotton or linen cloth. A ready method of constructing this apparatus is by placing a strip of thin cloth, six inches in length and two in breadth, lengthwise, upon a large speculum or a four or six-ounce vial. The tubing, taken at the middle of a piece six or seven yards long, is wound around the vial, and, after the requisite number of turns are made, the projecting ends of the cloth are doubled over the coils and stitched to the underlayer, between the turns of tubing. If, after completion, the turns are found too small, they may be readily enlarged by drawing the tubing through the cloth to any desired extent.



I have found this simple contrivance of essential service in the acute form of gonorrhœa, reducing inflammatory action promptly, and thus giving relief to painful micturition and erections.



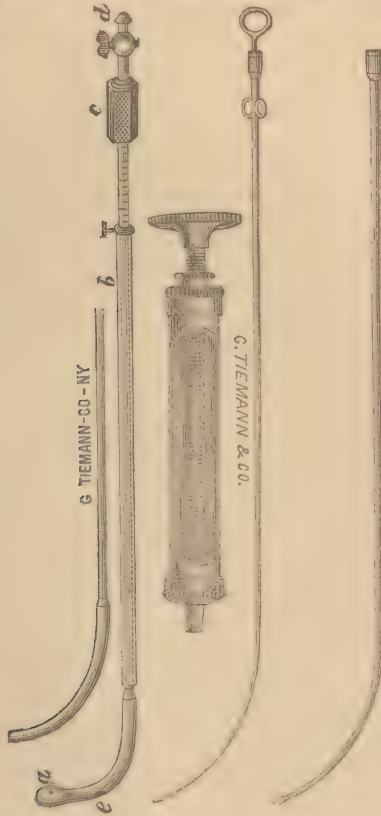
It has proved of great value in keeping down inflammation, and in preventing erections after the operation of circumcision. I habitually use it for the same purpose in operations for stricture, and with results more prompt and satisfactory than those hitherto attained by any medication or application with which I am familiar.

In examinations of the bladder for stone, where stricture is present, it is often difficult, on account of the contraction and the more or less spasm usually associated with it, to get sufficient play through the urethra to make an efficient examination of the bladder. Besides, in irritable subjects, when no stricture is present, spasm of the *compressores urethræ* not unfrequently holds the exploring instrument so as to impede, if it does not quite prevent, the examination. For the purpose of avoiding this embarrassment the

Canulated Exploring Sound may be used. It is simply an ordinary sound upon which a metallic or hard rubber canula, seven and a half inches in length, is made, so as to be movable on the shaft of the sound. When slid down against the shoulder at the commencement of the curve, and fastened by the screw at the proximal end of the canula, it may be used in the ordinary way; but when it is held by stricture or spasm, the screw is loosened, allowing the play of the sound through the tube.

The *Dilating Catheter* is used in the preparatory dilatation

of strictures too small to admit the necessary instruments for immediate operation. I have designed the accompanying modification of Sir Henry Thompson's* probe-pointed cathe-



ter. It consists simply of a fine probe-pointed silver tube, eleven inches in length and three millimetres in circumference at its point, gradually increasing in size, so that at six inches it is six millimetres. This tube is traversed by a steel stylet throughout its length. Carefully insinuated through a close stricture, by the aid of a finger in the rectum, until its point may be supposed to have reached the bladder, the stylet is removed, and a small syringe is applied to its proximal opening. If the instrument has passed the *sphinc-*

*Thompson on Stricture the Urethra. London Ed., 1858, p. 181.

ter vesicæ, on a withdrawal of the piston the urine will appear in the barrel of the syringe. The instrument may then be confidently pressed onward until the stricture is dilated to the largest capacity of the tube. A second tube of corresponding form, but with dimensions ranging from four millimetres at the point to eight millimetres, may then be similarly used.

In cases where, on account of the extreme closeness of the stricture, or from its divergent or tortuous course, a difficulty in passing the instrument occurs, Dr. Gouley's whalebone *guide-bougies* will prove serviceable.* These are used as in his grooved, canulated staff, viz., by the previous introduction of the guide-bougie into the bladder, *threading the dilating catheter upon it and following it down through the stricture*. Succeeding in this maneuver, the guide-bougie may be removed, the presence of the dilating catheter in the bladder tested by aid of the syringe, the stylet introduced, and the stricture dilated as previously described. The whalebone guide-bougies, to be used in this manner, require to be from sixteen to eighteen inches in length. They are easily made of *any* desired length and fineness, and, by steaming or rapid passage through the flame of an alcohol lamp, may be moulded at the extremity to any curve or angle deemed most likely to adapt itself to the eccentricity of the stricture.

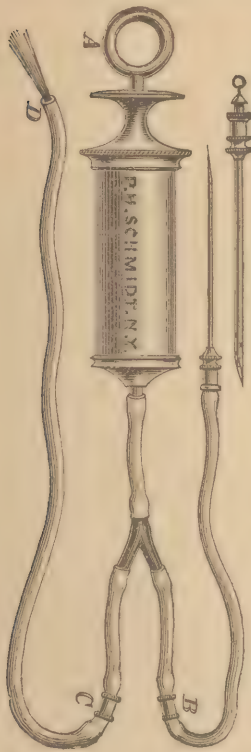
In comparison with all other instruments for the same purpose, the relatively smaller calibre of the dilating catheter must give it an important advantage in cases of stricture of extreme tenuity. Through its successful use, the earliest possible assurance of entrance into the bladder may be acquired. It is of simple construction, of flexible material, and of uniform strength. It will, I feel confident, enable the judicious and experienced surgeon to accomplish a satisfactory dilatation of many strictures, which, without its aid, would necessitate a puncture of the bladder or the perineal section.

Otis's Simplified Aspirator.—The accompanying engraving represents a simple instrument, the original of which was extemporized from materials within the easy reach of every surgeon, and so combined as to form an *aspirator*, complete and efficient for all ordinary purposes.

The "simplified aspirator" consists of an ordinary well-fitted syringe (A), of any convenient size, joined to which, by an inch of rubber tubing, is a short, hard rubber metal, or glass bifurcating tube. To each arm of this tube is attached another bit of rubber tubing, which terminates in a

*Gouley on Diseases of the Urinary Organs. New York, 1873, p. 51.

hard rubber valve, such as is used in the construction of the



Davidson syringe. These valves are arranged to work in reverse directions. On retraction of the piston of the syringe, the valve at B (connected by tubing with the aspirating needle) opens and permits access through the needle to the barrel of the syringe. The piston being driven back the valve at B closes, while that at C opens and empties the syringe through the connecting discharge-pipe. Near the base of the needle a short glass tube is inserted in order to afford early information of the character of the fluid in process of evacuation. "The simplified aspirator" was the result of a necessity for an instrument sufficiently small to fit in my "retention case," and a one-ounce hard-rubber syringe was found to be sufficiently large for easy aspiration of the bladder. In an emergency it might be used for transfusion, simply by adapting a small canula to the discharge pipe. This instrument has been duplicated by Mr. Schmidt, the surgical instrument maker, corner Thirty-fourth street and Broadway, and is put up in a case, with two sizes of aspiration needles, for nearly one-third the price of an ordinary aspirator of the cheapest description.

ordinary aspirator of the cheapest description.

